UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,028	12/28/2004	Yoichi Nakagawa	MAT-8645US	9202

23122   7590   01/23/2009
RATNERPRESTIA
P.O. BOX 980
VALLEY FORGE, PA 19482

EXAMINER
MALEK, LEILA

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
01/23/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

		Application No.	Applicant(s)
Office Action Summary		10/520,028	NAKAGAWA ET AL.
		Examiner	Art Unit	
		LEILA MALEK	2611	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>05 November 2008</u>.
2a) ☐ This action is FINAL.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-9 and 11-27</u> is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) <u>1-9 and 11-27</u> is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on <u>28 December 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☒ All   b)☐ Some * c)☐ None of:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail. Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   This office action is in response to the amendments received on 11/05/2008.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-9, 11, 12, and 23-27 are rejected under 35 U.S.C. 112, first paragraph,

as failing to comply with the enablement requirement. The claim(s) contains subject

matter which was not described in the specification in such a way as to enable one

skilled in the art to which it pertains, or with which it is most nearly connected, to make

and/or use the invention. As to claims 1, 23, 24, and 27, limitation "calculating plural

sets of transmitting symbol vectors" is not described in the specification in a way to

enable one skilled in the art to use the same method. Applicant discloses the calculation

of transmitting symbol vectors on pages 22 and 23 of the specification. However, it is

not clear why matrix V is chosen by the Applicant to be the transmitting symbol matrix

as oppose to matrix Λ. Applicant on page 13 of remarks argue that the receiving symbol

is represented as the sum of the singular value and the noise if V is chosen for the

transmitting symbol value. However, Examiner asserts that depending on value of

symbol selection vector C1, Λ can also be selected as the transmitting symbol value.

Therefore Applicant needs to further explain why matrix V is chosen as the transmitting

symbol vector. Furthermore, depending on how matrix h is decomposed, the three

obtained matrices from decomposition might be different than the ones obtained by the

Applicant. Therefore the transmitting symbol vectors would not be the same as the ones

obtained by the Applicant, and the Applicant in invention's disclosure fail to describe

how decomposition of h would necessarily lead to obtaining the transmission symbol

vector as cited by the Applicant. As disclosed previously the specification shall contain a

written description of the invention, and of the manner and process of making and using

it, in such <u>full, clear, concise, and exact terms as to enable any person skilled in the art</u>

<u>to which it pertains, or with which it is most nearly connected, to make and use the</u>

<u>same</u> and shall set forth the best mode contemplated by the inventor of carrying out his

invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 13 is rejected under 35 U.S.C. 102(e) as being anticipated by Ketchum et

al. (hereafter, referred as Ketchum) (US 2003/0185310)

As to claim 13, Ketchum discloses a receiving apparatus (see e.g. Fig. 3, 350) for

receiving data from a transmitting apparatus 310, the receiving apparatus comprising:

an antenna (e.g. 354a) for transmitting a carrier modulation signal including a known

symbol (see paragraphs 0072 and 0080, wherein Ketchum discloses that transmitter

can estimate channel response based on the pilot transmitted by the receiver system on

the uplink) and for receiving a signal from the transmitting apparatus; a propagation

parameter estimation means (see Fig. 5, block 512) for estimating a propagation

parameter from the received signal to generate receiving symbols (see the output of the

decoder 536), the received signal being a signal including a transmitting symbol

generated based on transmitting data and plural sets of transmitting symbols calculated

from the known symbol in the transmitting apparatus (see paragraphs 0067 and 0069);

and a symbol determination means for reconstructing the transmitting data from the

receiving symbols (see Fig. 5, blocks 522, 532, 534, and 536).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Ketchum, in view of Doberstein et al. (hereafter, referred as Doberstein) (US

6,424,678).

As to claim 14, Ketchum, discloses that the techniques described may be

implemented in various wireless communication systems, including OFDM and CDMA

systems, however, Ketchum does not expressly disclose a carrier separation means for

separating the receiving signal, which is configured by multiple carriers, into a plurality

of sub-carriers, wherein: the propagation parameter estimation estimates a propagation

parameter for each of the sub-carriers and the symbol determination means

reconstructs data from the received signal for each of the sub-carriers. Doberstein, in

the same field of endeavor, discloses a receiver comprising a propagation parameter

estimation means (see Fig. 6, block 618) for estimating a propagation parameter from a

receiving signal (see column 8, lines 27-31); and a symbol determination means (see

block 616) for reconstructing a transmitting data based on the propagation parameter.

Doberstein further discloses a carrier separation means for separating the receiving

signal, which is configured by multiple carriers, into a plurality of sub-carriers (see Fig.

6, blocks 610, 612, and 614), wherein: a propagation parameter estimation means

estimates a propagation parameter for each of the sub-carriers (see block 618 and

claim 5) and the symbol determination means (see block 616) reconstructs a

transmitting data from the receiving signal for each of the sub-carriers. Since Ketchum

discloses that his technique can be implemented in OFDM systems (i.e. a sub-carrier

based system) (see paragraph 0191), it would have been obvious to one of ordinary

skill in the art at the time of invention to modify Ketchum as suggested by Doberstein to

determine the effect of the communication channel for each of the data symbols and

reconstruct the transmitted signals more accurately.

As to claim 15, Ketchum discloses that the sub-carriers are any one of an OFDM

signal that is so configured as to be mutually-orthogonal in a frequency space and a

CDMA signal that is so configured as to be mutually-orthogonal in a code space (see

paragraph 0191).

As to claims 16 and 17, Ketchum further discloses an antenna element 354a (see Fig. 3), wherein said propagation parameter estimation means (see block 512) estimates the propagation parameter for that antenna.

As to claim 18, Ketchum discloses a receiving apparatus (see e.g. Fig. 3, 350) for receiving data from a transmitting apparatus 310, the receiving apparatus comprising: an antenna (e.g. 354a) for transmitting a carrier modulation signal including a known symbol (see paragraphs 0072 and 0080, wherein Ketchum discloses that transmitter can estimate channel response based on the pilot transmitted by the receiver system on the uplink) and for receiving a signal from the transmitting apparatus; a propagation parameter estimation means (see Fig. 5, block 512) for estimating a propagation parameter from the received signal to generate receiving symbol (see the output of the decoder 536), the received signal being a signal including a transmitting symbol generated based on transmitting data and plural sets of transmitting symbols calculated from the known symbol in the transmitting apparatus (see paragraphs 0067 and 0069); and a symbol determination means for reconstructing the transmitting data from the receiving symbol (see Fig. 5, blocks 522, 532, 534, and 536) based on the channel estimation results. Ketchum does not expressly disclose that the propagation channel estimation means applies orthogonal detection to a received baseband signal. Ketchum also does not disclose that the received symbol is a complex symbol. Doberstein in the same field of endeavor, discloses a receiver comprising a propagation parameter estimation means (see Fig. 6, block 618) for estimating a propagation parameter from a receiving signal (see column 8, lines 27-31); and a symbol determination means (see

block 616) for reconstructing a transmitting data based on the propagation parameter.

Doberstein further discloses a propagation parameter estimation means (see block 616)

for generating a receiving symbol that is a complex symbol by applying orthogonal

detection (by using a quadrature down-converter) to a received baseband signal (see

column 8, paragraphs 1-3). It would have been obvious to one of ordinary skill in the art

at the time of invention to modify Ketchum as suggested by Doberstein to fully recover

the baseband signal transmitted by the transmitter.

   As to claim 19, Doberstein further shows a carrier separation means for

separating the baseband signal (see Fig. 6), which is configured by a multiple carriers,

into N pieces of sub-carrier elements, where N is an integer of 2 or more, wherein: the

propagation parameter estimation means (see Fig. 6, block 618) generates the

receiving symbol for each of the sub-carriers after the carrier separation means (see

blocks 610, 612, and 614) separates the signal into the sub-carriers. Since Ketchum

discloses that his technique can be implemented in OFDM systems (i.e. a sub-carrier

based system) (see paragraph 0191), it would have been obvious to one of ordinary

skill in the art at the time of invention to modify Ketchum as suggested by Doberstein to

determine the effect of the communication channel for each of the data symbols and

more accurately reconstruct the transmitted signals.

4. Claims 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Ketchum and Doberstein, further in view of Subramanian.

   As to claim 20, Ketchum and Doberstein do not disclose that symbol

determination means reconstruct transmitting data after the propagation parameter

estimation means applies a reverse spread process to the baseband signal with N

pieces of spread codes, wherein N is an integer of 2 or more. Subramanian discloses a

communication system comprising a rake demodulator 108, wherein the rake

demodulator has been configured to de-spread the received signals with different

spreading codes (see Fig. 3 and column 5, lines 45-49). It would have been obvious to

one of ordinary skill in the art at the time of invention to modify Ketchum and

Doberstein, as suggested by Subramanian to take advantage of spread spectrum

techniques in the communication system and recover the received signal accurately.

5.   Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ketchum

and Doberstein, further in view of Bruekers et al. (hereafter, referred as Bruekers) (US

2002/0105907).

        As to claim 21, Ketchum and Doberstein, disclose all the subject matters claimed

in claim 19, except that symbol determination means determines a symbol based on the

receiving power of the antenna. Bruekers discloses a communication system

comprising a bit derivation circuit (interpreted as symbol determination) 17 that converts

the energy level of the bands (it has been interpreted as the received signal power at

the antenna) into a binary value (see paragraph 0055). It would have been obvious to

one of ordinary skill in the art at the time of invention to modify the symbol decision units

disclosed by Ketchum and Doberstein as suggested by Bruekers to perform a robust

verification of data (see paragraph 0006).

6.   Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Ketchum, Doberstein, and Subramanian, further in view of Bruekers.

As to claim 22, Ketchum, Doberstein, and Subramanian disclose all the subject matters claimed in claim 20, except that symbol determination means determines a symbol based on the receiving power of the antenna. Bruekers discloses a communication system comprising a bit derivation circuit (interpreted as symbol determination) 17 that converts the energy level of the bands (it has been interpreted as the received signal power at the antenna) into a binary value (see paragraph 0055). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the symbol decision units disclosed by Ketchum and Doberstein as suggested by Bruekers to perform a robust verification of data (see paragraph 0006).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner
Art Unit 2611

/L.M./
/Leila Malek/
Examiner, Art Unit 2611

/Mohammad H Ghayour/
Supervisory Patent Examiner, Art Unit 2611